## REMARKS

After the foregoing Amendment, claims 1-11 are pending in the present application. Claims 1-5 and 7-11 have been amended to more particularly point out indistinctly claim the subject matter which Applicant regards as the invention. Applicant submits that no new matter has been added to the application by the amendment.

## THE PRESENT INVENTION

The present invention provides a method of decoding a moving image signal. The image signal is a stream of pixel blocks segregated into video frames and at least two decoded video frames are temporarily stored in a memory. The method includes constructing at least two motion vectors. The first motion vector is constructed from a present video frame and a video frame processed immediately prior to the present video frame. The second motion vector is constructed from the present video frame and the video frame processed two frames immediately prior to the present video frame. The at least two vectors are related to a pixel block of the stream of pixel blocks of a present frame. The motion of the at least two previously decoded video frames stored in memory is compensated with respect to a corresponding one of the at least two motion vectors. A predicted video frame is generated from each of the at least two previously decoded video frames for reconstructing the present pixel block of the present video frame. In this way, the predicted video frame used in reconstruction of the present pixel block is selected depending on the presence or absence of decoding error contained in the two or more predicted video frames.

## REJECTIONS UNDER 35 U.S.C. § 102

The Examiner has rejected claims 1-6 and 9 under 35 U.S.C. § 102 as being unpatentable over U.S. Patent No. 5,737,022 (Yamaguchi et al.) The Examiner contends that Yamaguchi disclose a variable length code decoding means, a motion compensation means, a bit error detecting means, and a

predicted image selecting means in accordance with the Applicant's claims. Applicant respectfully traverses the rejection.

Amended claim 1 recites, *inter alia*, a method of decoding a moving image signal wherein video frames of the the signal is decoded by the steps of:

"constructing at least two motion vectors, the first motion vector being constructed from a present video frame and a video frame processed immediately prior to the present video frame, the second motion vector being constructed from the present video frame and the video frame processed two frames immediately prior to the present video frame for relating to a pixel block of the stream of pixel blocks of a present video frame;

compensating the motion of at least two previously decoded video frames stored in a memory with respect to a corresponding one of the at least two motion vectors;

generating a predicted video frame from each of the at least two previously decoded video frames for reconstructing the pixel block of the present video frame...." (emphasis added).

While the use of motion vectors for reconstructing an image is an essential and known component of inter-frame encoding/decoding technology. The present invention does not simply employ known methods such as merely constructing a motion vector from a present frame and the frame immediately preceding the present frame. The present invention constructs at least two motion vectors, the first motion vector being constructed from a present frame and a frame processed immediately prior to the present frame, the second motion vector being constructed from the present video frame and the video frame processed two frames immediately prior to the present video frame. The error of the at least two motion vectors is detected and the vector without error is selected to decode the present video frame.

Yamaguchi et al. discloses a motion picture error concealment and compensation method. The concealment method is directed to concealing packets of an ATM cell lost by packet discarding or transmission line error.

The motion compensation means (elements 113, 141, and 144) shown in Fig. 7 operates in the following manner. The motion compensation means conceals a pixel block X (as shown in Fig. 8) by storing adjacent pixel blocks (i.e., blocks A-H in Fig. 8) of an image in a frame memory 130. A concealment circuit creates a prediction value for use of motion compensation information of decodable blocks among the blocks A-H. Thus, a prediction value is derived for a pixel near the block X from the reference image (i.e., the present frame blocks A-H) read out from the frame memory 130. Then, a motion compensation error evaluation circuit 142 calculates an error evaluation value between the read out reproduced image and a prediction value of a pixel block adjacent to the block X. The error evaluation value is provided to a selection circuit 143. The selection circuit 143 selects the motion compensation prediction value having a minimum error for use in concealing block X.

A second motion compensation circuit 144 creates a motion compensation prediction value of the block X based on a reference image signal read out from the frame memory 130. If the block X is detected to be a decodable block, a selector 150 outputs a signal corresponding to the block X stored in the frame memory 130 via a feedback line 60 (i.e., the frame immediately preceding the present frame). If a block is a non-decodable block, a concealment image (in a position corresponding to the block X) from the immediately preceding frame is supplied from the second motion compensation prediction circuit 144 via the line 60.

In this way, the error in reception of block X is concealed by predicting block X by way of adjacent blocks and motion vectors of the same frame, or, by simply replacing block X with a corresponding block of the immediately preceding frame stored in memory. Yamaguchi et al. do not disclose or suggest reconstructing a pixel block of a present video frame by applying motion vectors of the present video frame to at least two previously decoded video frames, "...the second motion vector being constructed from the present video frame and the video frame processed two frames immediately prior to the present video frame..." The error of the at least two motion vectors is detected

and the vector without error is selected to decode the present video frame. All the motion vectors disclosed in Yamaguchi et al. are constructed from the present frame and the frame immediately preceding the present frame.

Accordingly, Applicant respectfully requests that the rejection of claim 1 under 35 U.S.C. § 102 be withdrawn.

Claim 2 is directly dependent upon claim 1, and therefore, is allowable over Yamaguchi et al. for at least the same reasons discussed above.

Independent claims 3-5 recites substantially the same limitation as discussed above with reference to claim 1. Likewise, Applicant submits that claims 3-5 are allowable at least for the same reasons discussed above. Thus, Applicant respectfully requests that the rejection of claims 3-5 under 35 U.S.C. § 102 be withdrawn.

Claim 6 is directly dependent upon claim 5 and therefore, is allowable over Yamaguchi et al. at least for the same reasons.

Amended claim 9 recites, *inter alia*, a moving image signal coding apparatus including "motion compensation means for issuing plural predicted images based on stored video frames from the output of said motion vector detecting means..."

As discussed above, Yamaguchi et al. do not disclose reconstructing a pixel block of a present frame by applying motion vectors of the present frame to at least two motion vectors, "...the second motion vector being constructed from the present frame and the frame processed two frames immediately prior to the present frame..." The error of the at least two motion vectors is detected and the vector without error is selected to decode the present video frame. Accordingly, Applicant respectfully requests that the rejection of claim 9 under 35 U.S.C. § 102 be withdrawn.

In view of the above, Applicant respectfully requests that the rejection of claims 1-6 and 9 under 35 U.S.C. § 102 be withdrawn.

REJECTIONS UNDER 35 U.S.C. § 103

The Examiner has rejected claims 7 and 8 under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 5,737,022 (Yamaguchi et al.) The Examiner contends that although Yamaguchi does not specifically disclose the memory being configured in a map format, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Yamaguchi et al. to arrive at the Applicant's invention. Applicant respectfully traverses the rejection.

Applicant submits that since independent claim 5 has been shown to be allowable with respect to the cited reference, claims 7 and 8 are allowable, at least by their direct or indirect dependency upon claim 5. Accordingly, Applicant respectfully requests that the rejection of claims 7 and 8 under 35 U.S.C. § 103 be withdrawn.

The Examiner has rejected claims 10 and 11 under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 5,737,022 (Yamaguchi et al.) The Examiner contends that although Yamaguchi does not specifically disclose a predicted image combining means, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Yamaguchi et al. to arrive at the Applicant's invention. Applicant respectfully traverses the rejection.

Applicant submits that since independent claim 5 has been shown to be allowable with respect to the cited reference, claims 10 and 11 are allowable, at least by their direct or indirect dependency upon claim 9. Accordingly, Applicant respectfully requests that the rejection of claims 10 and 11 under 35 U.S.C. § 103 be withdrawn.

## CONCLUSION

In view of the foregoing amendment and remarks, it is respectfully submitted that the present application, including claims 1-11, is in condition for allowance, and such action is respectfully requested at an early date.

Respectfully Submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

CLAIMS:

1. (Twice Amended) A method of decoding a moving image signal, the image signal being a stream of pixel blocks segregated into [image] video frames, the method comprising the steps of:

[decoding] constructing at least two motion vectors, the first motion vector being constructed from a present video frame and a video frame prior to the present video frame, the second motion vector being constructed from the present video frame and a further video frame at least two frames prior to the present video frame [relating to a pixel block of the stream of pixel blocks of a present video frame];

compensating the motion of at least two previously decoded [image] video frames stored in a memory with respect to a corresponding one of the at least two motion vectors;

generating a predicted [image] video frame from each of the at least two previously decoded [image] video frames after receiving compensating for reconstructing the pixel block of the present video frame,

wherein the predicted [image] video frame [used in reconstruction of the present pixel block] is selected depending on the presence or absence of a decoding error contained in said predicted [images] video frame.

2. (Twice Amended) A method of decoding a moving image signal of claim 1, wherein if plural predicted [images] video frames are free from decoding error [in said predicted images],

the predicted [image] video frame produced from the latest decoded frame in time out of said predicted [images] video frames free from decoding error is used in reconstruction of the present processing pixel block.

3. (Twice Amended) A method of coding a moving image signal, the image signal being a stream of pixel blocks segregated into [image] video frames, at least two decoded [image] video frames being temporarily stored in a memory [for detecting and coding at least two motion vectors relating to the present processing pixel block], comprising the steps of:

constructing at least two motion vectors, the first motion vector being constructed from a present video frame and a video frame prior to the present video frame, the second motion vector being constructed from the present video frame and a further video frame at least two frames prior to the present video frame

inter-coding the present processing pixel block when the correlation of the at least two [images] video frames in memory when compensated of motion by said at least two motion vectors is greater than a predetermined value, and

intra-coding the present processing pixel block when the correlation of the at least two video images in memory when compensated of motion by said at least two vectors is less than a predetermined value.

4. (Twice Amended) A method of coding a moving image signal, the image signal being a stream of pixel blocks segregated into [image] video frames, for [detecting and coding] constructing at least two motion vectors [relating to the present processing pixel block], comprising the steps of:

storing at least two decoded [image] video frames [being temporarily stored] in a memory;

constructing at least two motion vectors, the first motion vector being constructed from a present video frame and a video frame prior to the present video frame, the second motion vector being constructed from the present video frame and a further video frame at least two frames prior to the present video frame ;

selecting a predicted [image] video frame produced from the latest decoded video frame in time out of at least two video frames images in memory when compensated of motion by said at least two motion vectors; and

coding the present processing pixel block in accordance with the selected predicted [image] video frame.

5. (Twice Amended) A moving image signal decoding apparatus comprising:

variable length code decoding means for decoding at least two motion vectors relating to the present processing pixel block, the first motion vector being constructed from a present video frame and a frame prior to the present video frame, the second motion vector being constructed from the present video frame and a further video frame at least two frames prior to the present video frame,

motion compensation means for compensating the motion of a previously coded video frame with respect to each one of said at least two

motion vectors, and generating at least two predicted [images] video frames relating to the present processing pixel block,

bit error detecting means for detecting a bit error from the output of said variable length code decoding means,

memory means for storing the bit error of said bit error detecting means, and

predicted [image] video frame selecting means for recognizing the presence or absence of decoding error contained in said at least two predicted [images] video frames, and selecting the predicted [image] video frame to be used in reconstruction of the present processing pixel block.

7. (Twice Amended) A moving image signal decoding apparatus [of moving image signal] of claim 5, wherein the memory means stores the bit errors [in] of plural video frames by plotting the pixel blocks in which bit error is detected in each video frame in a map form.

8. (Twice Amended) A moving image signal decoding apparatus of claim 7, wherein the memory means comprises plural decoding error map memories storing each video frame consecutive in time, and changeover means, said plural decoding error map memories being changed over by said changeover means, and issued.

9. (Twice Amended) A moving image signal coding apparatus comprising:

motion vector detecting means for [detecting] constructing at least two motion vectors, the first motion vector being constructed from a present frame and a frame processed immediately prior to the present frame, the second motion vector being constructed from the present frame and the frame processed two frames immediately prior to the present frame for relating to the present processing pixel block.

motion compensation means for issuing plural predicted [images] video frames based on stored [images] video frames from the output of said motion vector detecting means, and

intra/inter judging means for inter-coding the present processing pixel block when the correlation of at least two predicted [images] video frames compensated of motion by said at least two motion vectors as the output of said motion compensation means is greater than a predetermined value, and intra-coding the present processing pixel block when the correlation of said at least two predicted [images] video frames is less than a predetermined value.

10. (Twice Amended) A moving image signal coding apparatus of claim 9, further comprising:

predicted image combining means for combining the at least two predicted [images] video frames compensated by said at least two motion vectors, and

prediction error calculating means for calculating the prediction error from the output of said predicted [image] video frame combining means and a macro block of the present video frame,

wherein the intra/inter judging means judges before processing by comparing the variance of present processing pixel block and the variance of prediction error from the output of the prediction error calculating means to judge processing before intra/inter coding, and processes next intra/inter judgement only when judged to be inter-coding.

11. (Twice Amended) A moving image signal coding apparatus of claim 10, wherein said predicted image combining means issues a predicted [image] video frame produced from the latest decoded video frame in time out of the at least two or more predicted [images] video frames compensated of motion by said at least two motion vectors for use in coding of the present processing pixel block.